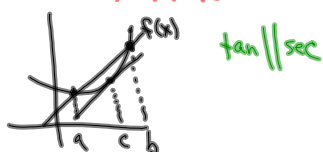


Review 9 MVT for derivatives

If  $f(x)$  is continuous on  $[a,b]$  and differentiable on  $(a,b)$  then  $c$  exists:  $a < c < b$  and:

$$f'(c) = \frac{f(b) - f(a)}{b - a}$$

inst rate = ave rate



Ex 1  $f(x) = x + \ln x$ . What is the value of  $c$  for which the instantaneous rate of change of  $f$  at  $x=c$  is the same as the average rate of  $f$  over  $[1,4]$

$$f'(c) = 1 + \frac{1}{c} = \frac{(4 + \ln 4) - (1 + \ln 1)}{4 - 1} \quad (\text{calc ok})$$

$$c = 2.164$$

Mar 14-8:04 AM

Mar 14-8:12 AM

Ex 2

$x$	0	1	2	3	4
$f(x)$	2	3	4	3	2

$f$  is continuous and differentiable on  $[0,4]$ . Which of the following must be true?

- (A) the min value  $f$  on  $[0,4]$  is 2
- (B) " max " " " is 4
- (C)  $f(x) > 0$  for  $0 < x < 4$
- (D)  $f'(x) < 0$  for  $2 < x < 4$
- (E) there exists  $c$ , with  $0 < c < 4$  for which  $f'(c) = 0$

Mar 14-8:20 AM